

ICS: H01L 29/20

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TI: ***BIPOLAR*** TYPE ***TRANSISTOR***

AB: PURPOSE: To obtain excellent high speed features and to obtain a high current amplification factor, by setting the maximum value of majority carriers in a base region at the density of state or less, where majority carriers are present, by built-in voltages between an emitter region and a base region and between the base region and a collector region.

CONSTITUTION: On an n+ GaAs substrate 11, the following regions are sequentially laminated by an MBE method: an n-type GaAs collector region 12; a p+ type GaAs region 13; an n-type Al_xGa_{1-x}As transient region 14, in which the composition is controlled so that the band gap is gradually changed; an n-type Al_{0.3}Ga_{0.7}As emitter region 15; and n+ type GaAs ***cap*** layer*** 16, which facilitates ohmic contact with the emitter region. The impurity density of the collector region 12 is 5times;10¹⁶cm⁻³, and Si is used as n-type ***dopant***. Be is used as ***dopant*** in the base region 13. Its impurity density is 5times;10¹⁹cm⁻³ and its thickness is set at 10Å. Both the transition region 14 and the emitter region 15 have the impurity density of 3times;10¹⁷cm⁻³. The cap layer 16 is ***doped*** to the high concentration of 5times;10¹⁸cm⁻³.

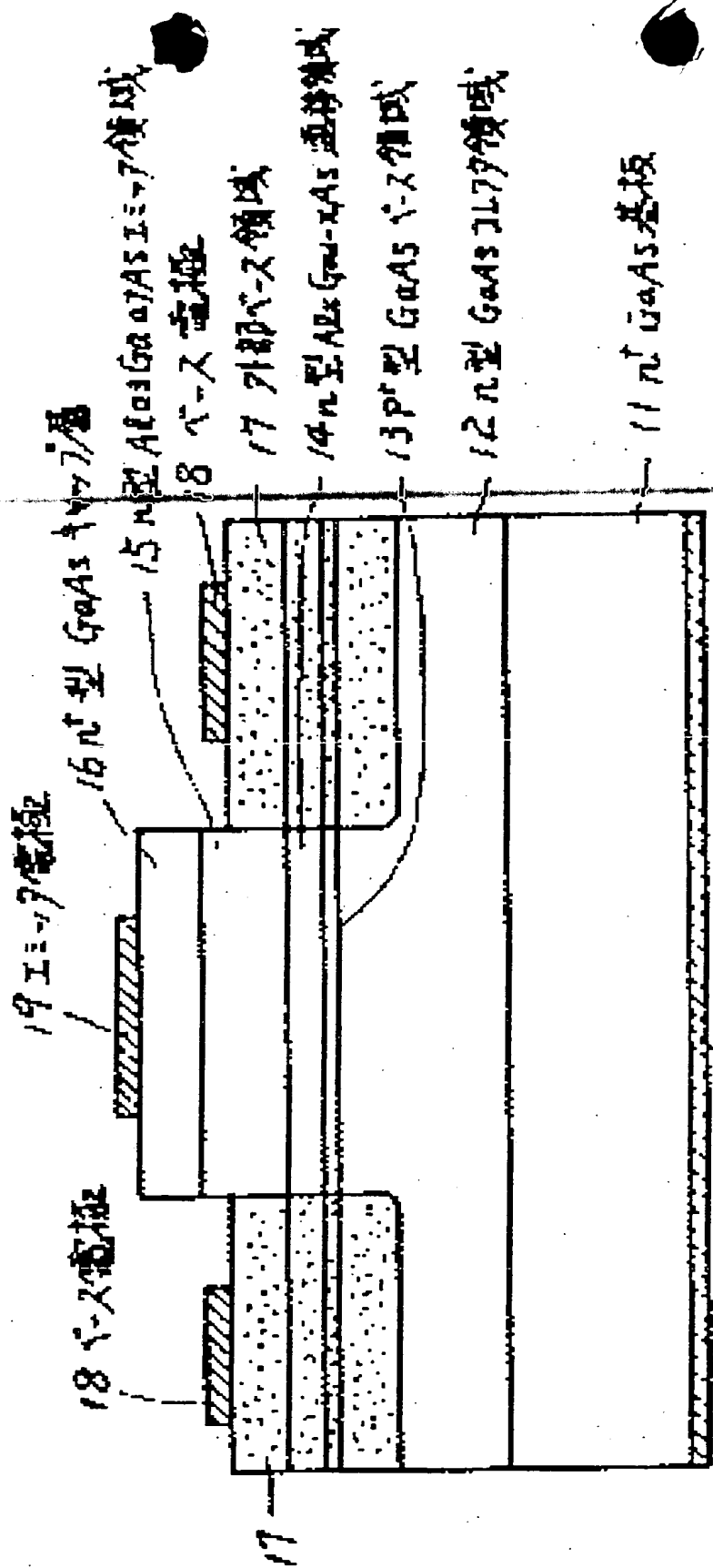
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Mandant



11 n⁺ GaAs 基板
 12 n 型 GaAs JL777 領域
 13 p 型 GaAs i 領域
 14 n 型 Al_xGa_{1-x}As 遷移領域
 15 n 型 Al_{0.3}Ga_{0.7}As i 領域
 16 n 型 GaAs JL777 層
 17 p 領域
 18 i 領域
 19 i 領域
 20 p 領域

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